

## SHORT COMMUNICATION

***Didymoplexiella trichechus* (J.J. Sm.) Garay and a New Variety of  
*Didymoplexis cornuta* J.J. Sm. (Orchidaceae) in Borneo**

HIROKAZU TSUKAYA<sup>1</sup>, MONICA SULEIMAN<sup>2</sup> AND HIROSHI OKADA<sup>3,4</sup>

<sup>1</sup>*Department of Biological Sciences, Graduate school of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan. \*tsukaya@bs.s.u-tokyo.ac.jp (author for correspondence);* <sup>2</sup>*Institute for Tropical Biology and Conservation Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia;* <sup>3</sup>*Graduate School of Science, Osaka City University, Sugimoto, Sumiyoshi-ku, Osaka 558-8585, Japan;* <sup>4</sup>*Institute of Natural Environmental Sciences, Hyogo Prefectural University, Sanda, Hyogo 669-1546, Japan*

We report the occurrence of *Didymoplexiella trichechus* (J.J. Sm.) Garay and *Didymoplexis cornuta* J.J. Sm. in Sabah, Borneo, Malaysia. They were considered to be endemic to Sumatra and Java, respectively, but were discovered during a botanical expedition in the Maliau Basin Conservation Area. We also determined the collection of *Didymoplexis cornuta* to represent a novel variety, *D. cornuta* var. *maliauensis* Tsukaya, M. Suleiman & H. Okada.

Key words: Borneo, *Didymoplexiella trichechus*, *Didymoplexis cornuta* var. *maliauensis*, mycoheterotroph, Orchidaceae, Sabah

Mycoheterotrophic plants lack chlorophyll and depend on mycorrhizal fungi for nutrients (Hynson *et al.* 2013) and are most abundant in tropical forests. *Didymoplexiella* Garay (Orchidaceae, subfamily Epidendroideae, tribe Gastrodieae, subtribe Gastrodiinae) and *Didymoplexis* Griff. (subtribe Gastrodiinae) are mycoheterotrophic and closely related, differing only in the presence (*Didymoplexiella*) or absence (*Didymoplexis*) of stelidia (Garay 1954). *Didymoplexiella* Garay is composed of nine species, five of which occur in Borneo (Wood & Cribb, 1994). The other species include *D. denticulata* Aver., described from Vietnam (Averyanov 2010), *D. hainanensis* X.H. Jin & S.C. Chen, described from Hainan, China (Jin *et al.* 2004), and *D. siamensis* (Rolfe ex Downie) Seidenf., which is known from Thailand, Hainan and Taiwan, China, and Yakushima, Japan (Chen *et al.* 2009). *Didymoplexiella*

*trichechus* (J.J. Sm.) Garay was reported from Banca (Bangka) Island, Sumatra (Smith 1920) and on Mt. Talamau, Sumatra (Comber 2001), but not from outside Sumatra.

*Didymoplexis* Griff. (subtribe Gastrodiinae) contains approximately 20 species, 3 of which: *D. latilabris* Schltr., *D. pallens* Griff., and *D. striata* J.J. Sm., occur on Borneo (Wood & Cribb, 1994). Recently, we (H.T. and H.O.) reported the occurrence of *D. cornuta* var. *betung-kerihunensis* Tsukaya & H.Okada in West Kalimantan, Borneo. *Didymoplexis cornuta* var. *cornuta* was known only from near Bogor, West Java (Smith 1925). The disjunct distribution in Java and West Kalimantan suggests that *D. cornuta* may also be found in other areas.

During floristic studies in Central and West Kalimantan we named a new genus, several new species, and a new mycoheterotroph (Tsukaya &

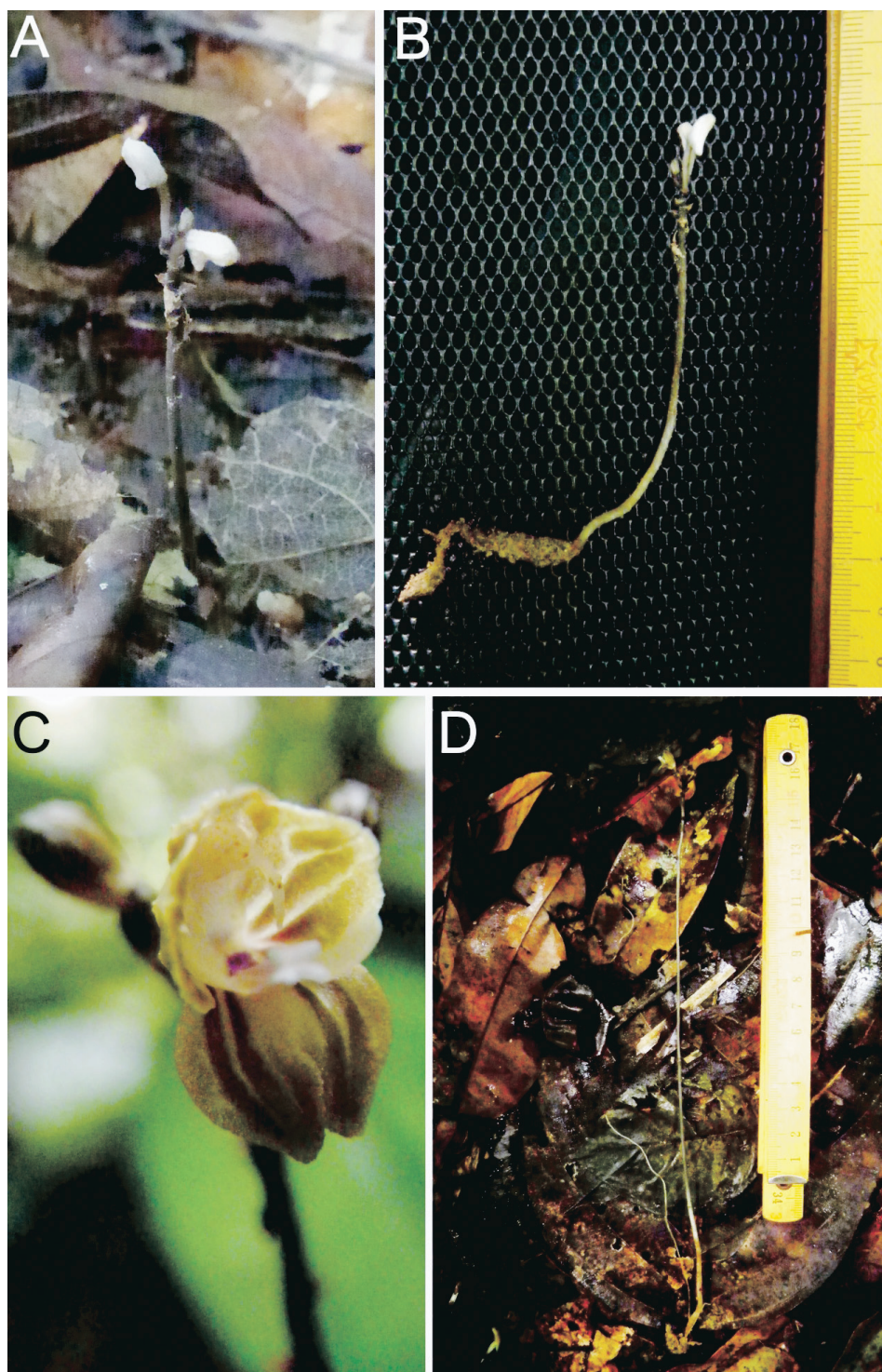


FIG. 1: *Didymoplexis cornuta* var. *maliauensis* Tsukaya, M.Suleiman & H.Okada and *Didymoplexiella trichechus* (J.J. Sm.) Garay in nature. A, B, *Didymoplexis cornuta* var. *maliauensis*. C, D, *Didymoplexiella trichechus*. Unit of scales for B and D; 1 cm.

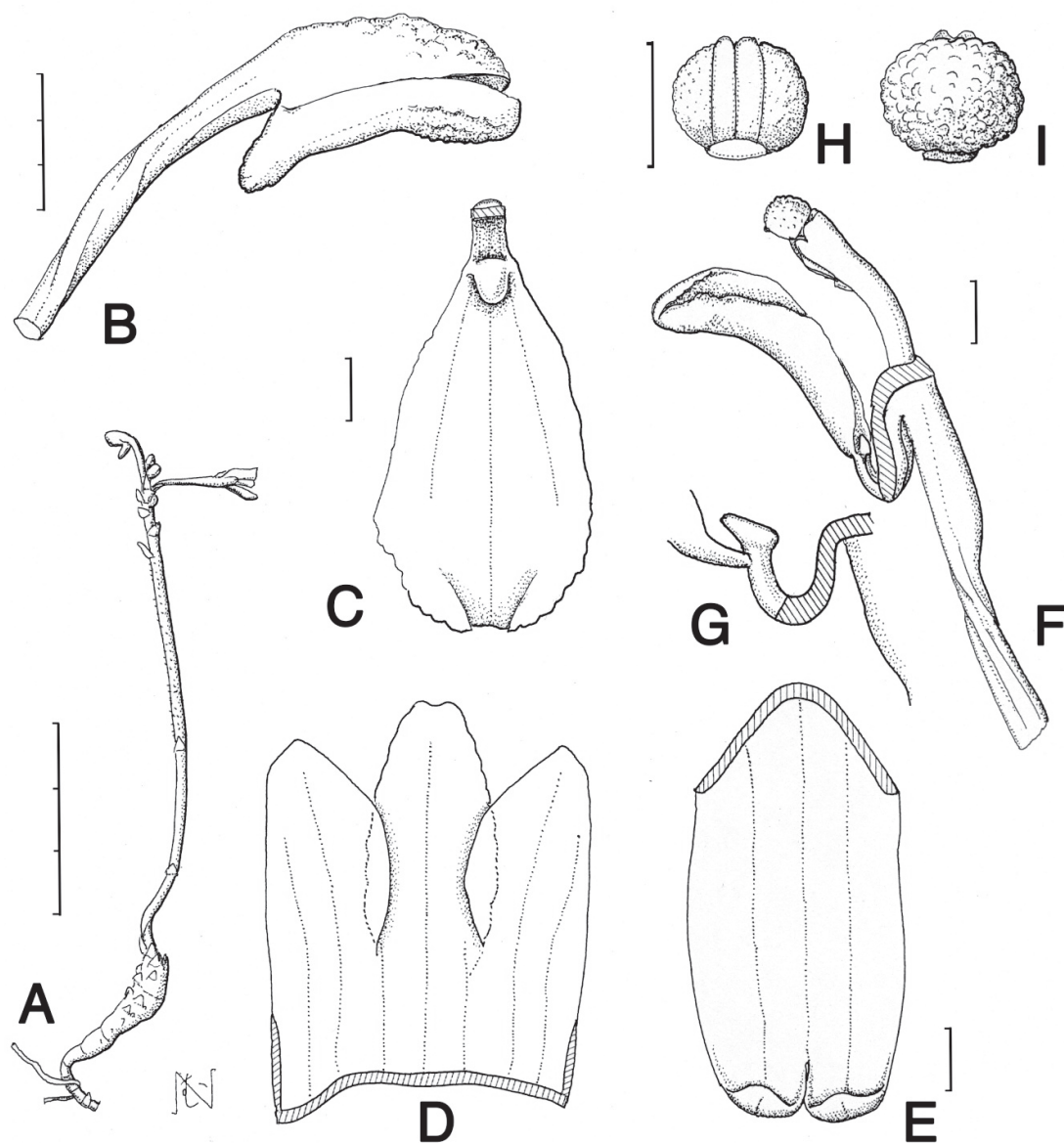


FIG. 2: *Didymoplexis cornuta* var. *maliauensis* Tsukaya, M.Suleiman & H.Okada. A, Gross morphology. B, Flower, lateral view. C, Lip. Note presence of an appendage at base and absence of ridges on surface. D, Connate dorsal sepal and lateral petals. E, Connate lateral sepals. F, Lip with column, lateral view. G, Magnified view of basal part of lip showing appendage at the base. H, I, Anther. Scale for A; 1 cm, and B-H; 1 mm. All pictures were drawn from the type specimen by Mut-suko Nakajima.



Okada 2005, 2012a, 2012b, 2013a, 2013b, Tsukaya *et al.* 2011) Based on these findings, we undertook a botanical expedition in the Maliau Basin Conservation Area, Sabah, which covers 590 km<sup>2</sup> of natural forests. During the survey, we discovered flowering plants of *Didymoplexiella trichechus* for the first time outside of Sumatra. We also found a new variety of *Didymoplexis cornuta*, which represents the second report for this species from Borneo. We here describe the morphology of these taxa and discuss the diversity and distribution of *Didymoplexis* and *Didymoplexiella* in Borneo.

## Materials and Methods

### Flower structure

Flower structures of specimens preserved in 50% (v/v) ethanol were observed under a stereo microscope. Anatomical figures were drawn by Ms. Mutsuko Nakajima using a microscope equipped with a camera lucida.

### Research permission

This study was carried out under the following permissions: YS/MBMC/2013/50 from the Maliau Basin Management Committee and access license JKM/MBS.1000-2/2(152) from the Sabah Biodiversity Council.

## Results and Discussion

During the expedition from August 15 to 20 2013, we collected *Didymoplexis cornuta* (collection number: KKT-4; Fig. 1, 2), and *Didymoplexiella trichechus* (collection number: KKT-14; Fig. 3).

*Didymoplexis cornuta* was thought to be endemic to Java, but we recently reported *D. cornuta* from West Kalimantan (Tsukaya & Okada 2012b). *Didymoplexis cornuta* var. *betung-kerihunensis* lacks the small, horn-like appendage at the base of the claw (Smith 1925), which is characteristic of the specimen from Sabah and of *D. cornuta* var. *cornuta* (Fig. 2). The collection from West Kalimantan lacks ridges on the lip. Based on morphological differences and disjunct distribution,

we propose the plants from Maliau Basin to be an undescribed variety of *Didymoplexis cornuta*, which we here name var. *maliauensis*.

*Didymoplexiella trichechus* was thought to be endemic to Sumatra, while five species of *Didymoplexiella* are known from Borneo (Wood & Cribb, 1994). *Didymoplexiella trichechus* now makes sixth species known from Borneo. Considering the close relationship of *Didymoplexiella* and *Didymoplexis*, we hypothesize that the highest diversity of *Didymoplexiella* on Borneo indicates that it is derived from larger, widely distributed genus *Didymoplexis* on Borneo. Molecular phylogenetic analysis is required to confirm this hypothesis.

### Taxonomic treatment

***Didymoplexis cornuta* var. *maliauensis*** Tsukaya, M. Suleiman & H. Okada, **var. nov.** –Fig. 1 A, B, Fig. 2

Differing from *D. cornuta* var. *cornuta* and *D. cornuta* var. *betung-kerihunensis* in lacking ridges on the adaxial surface of the lip and from *D. cornuta* var. *betung-kerihunensis* in having a small appendage at the base of the claw. The appendage was described as horn-like in *D. cornuta* var. *cornuta*, but is semi-oval in var. *maliauensis*.

*Typus.* Malaysia, Sabah, Maliau Basin Conservation Area, 04°45'41"N, 116°55'57"E, 425–m alt., from Study Center to Seraya Camp, 354–m altitude, 04°45'38"N, 116°56'20"E., 15 August, 2013. *H. Tsukaya, M. Suleiman & H. Okada KKT-4* (BORH, specimen preserved in 50% ethanol).

Herbs, terrestrial, achlorophyllous, mycoheterotrophic. Rhizome less than 2 cm long, 4 mm in diameter, tuber-like. Roots 2 or more. Stem erect, simple, dark purple (darker at apex, paler basally). The underground part of stem dirty white. Bracts minute, triangular, acuminate, ca. 1.5 mm long, dark purple (brown at maturity). Ovary pedicellate, 8 mm long, white with a pale purple tinge (particularly along ridges). Flowers white, faintly blushed with purple on the abaxial surface, 6 mm long. Lateral sepals connate except at apex, slightly undulate, white, abaxial surface slightly warty, free apex ca. 1 mm long, retuse; dorsal sepal and lateral petals ca. 6 mm long, con-

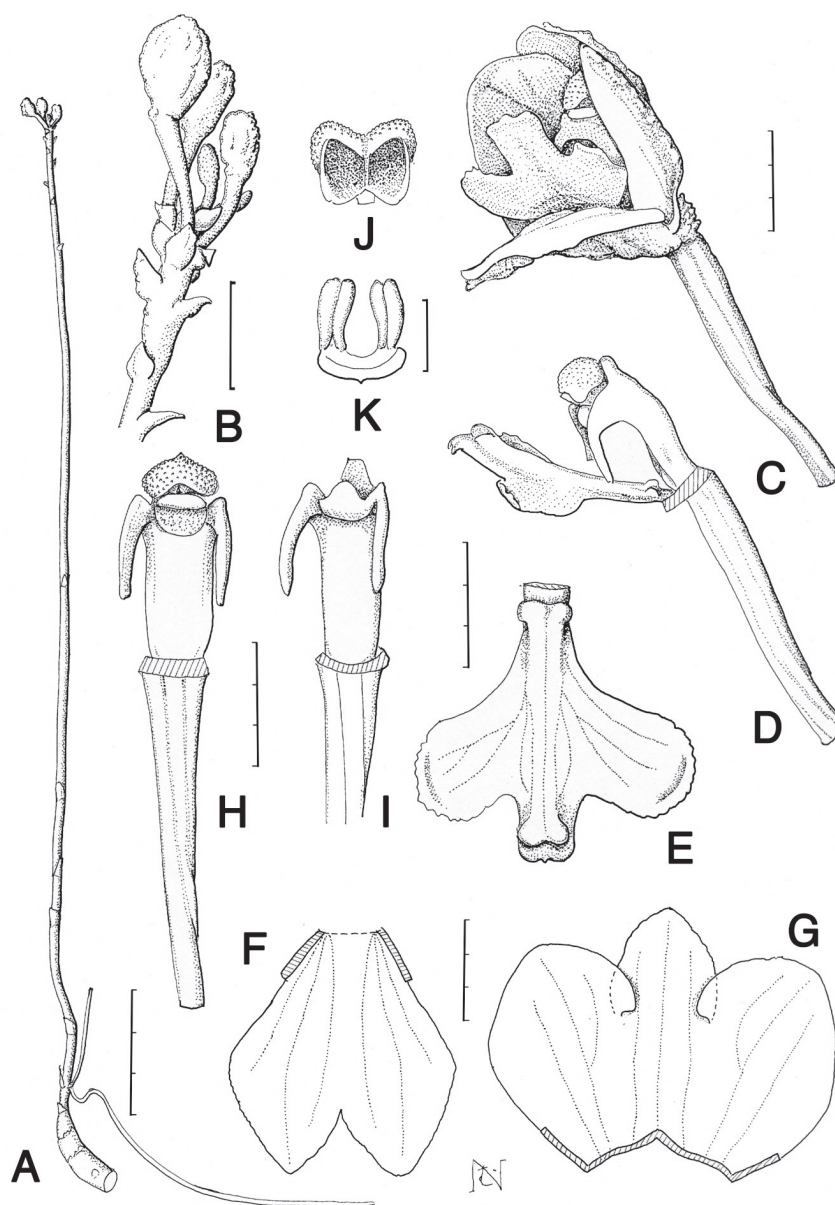


FIG. 3: *Didymoplexiella trichechus*. A, Gross morphology. B, Inflorescence bearing flower buds. C, Flower. D, Lip and column, lateral view. E, Lip. F, Connate lateral sepals. G, Connate dorsal sepal and lateral petals. H, Column with anther cap. I, Column with anther cap detached. J, Anther cap. K, Anther. Scale for A, B; 1 cm, and C-K; 1 mm. All pictures were drawn from the type specimen by Mutsuko Nakajima.

nate at base ca. 1/3 their length, forming a loose hood over column. Apex of lateral petals obtuse. Petals white, free portion lanceolate, slightly warty, 2–2.5 mm wide. Lip white, without ridges on the surface, oblong-triangular, apical margin with shallow teeth, 6.4 mm long, 3.6 mm wide. Spur ca. 2 mm long. Appendage at base of adaxi-

al surface of claw of lip flat, semi-oval. Column white, clavate, 4 mm long. Pollinia 4. Anther cap white. Fruit not seen.

***Didymoplexiella trichechus* (J.J. Sm.) Garay** – Fig. 3

*Didymoplexiella trichechus* has been found at

two localities, Banca (Bangka) Island, Sumatra (Smith 1920) and Mt. Talamau on Sumatra (Comber 2001). It is easily distinguished from similar species by its brown sepals, white veins of the lateral petals, purple stripes on the lateral sepals, and a white lip tinged reddish purple at the base.

*Specimen examined.* Malaysia, Sabah: Maliau Basin Conservation Area, from Seraya Camp to Maliau Fall, along a large branch stream, Ginseng River, 425-m altitude, 04°45'41"N, 116°55'57"E, on slope in tropical rain forest, Sabah, Borneo, Malaysia. 17 August, 2013, H. Tsukaya, M. Suleiman & H. Okada KKT-14 (BORHcv, specimen preserved in 50% ethanol).

Several photographs with characteristics similar to *Didymoplexiella trichechus* and taken in Thailand are available online at [http://board.trekkingthai.com/board/print.php?forum\\_id=18&topic\\_no=183054&topic\\_id=185378&mode=normal](http://board.trekkingthai.com/board/print.php?forum_id=18&topic_no=183054&topic_id=185378&mode=normal). Further surveys may reveal *D. trichechus* to be widely distributed in Thailand, Sumatra, and Borneo.

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